

**TITLE OF INVENTION****LOW TEMPERATURE ALKALI METAL ELECTROLYSIS**

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**ABSTRACT**

A low temperature alkali metal electrolysis process is provided. The process comprises carrying out the electrolysis in the presence of a co-electrolyte and an alkali metal halide. The co-electrolyte comprises (1) a nitrogen-containing compound and optionally one ore more Group IB halides, Group IIIA halides, Group VIII halides; 10 (2) a Group IIIA halide, a Group VB halide, or combinations of a Group IIIA halide and a Group VB halide; or (3) water. Also provided is a low temperature electrolysis process, which comprises carrying out the process using a cathode that comprises (1) a liquid alkali metal; (2) an alloy of two or more metals selected from the group consisting of bismuth, lead, tin, antimony, indium, gallium, thallium, and cadmium; or 15 (3) an electrically conductive liquid solvated alkali metal. Further provided is an electrolyte comprising an alkali metal halide and a co-electrolyte that comprises (1) a nitrogen-containing compound and optionally one ore more Group IB halides, Group IIIA halides, Group VIII halides or (2) a Group IIIA halide, a Group VB halide, or combinations of a Group IIIA halide and a Group VB halide.

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